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R. Dawson, R.I.A., F.F.C.S., F.C.I. (Eng.), Secretary-Manager and Editor

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EDITORIAL

Additional Deductions at Source

Recently details of a Dominion Health Insurance Plan was given to the public and immediately there was a decided reaction against the proposals from the public at large. The main argument advanced against the proposals was that the scheme was far too costly and from the salaried and professional man, the argument came that he was taxed heavily enough as it was and that there was no earthly reason why he should be taxed again to pay for the health insurance of some other person. Many arguments have been advanced in the public press tending to show that the scheme need not be nearly so costly. Not being an actuary, we do not know how costly it should be but there is one thing that should be remembered and that is that individual company sick benefit schemes are far less costly because, in the first place, workers are compelled to undergo a fairly rigid health examination before being hired under such a scheme whereas, in an overall Dominion wide scheme such as that propounded by the Dominion Government, everyone, sick or well, healthy or unhealthy, would be included. However, apart altogether from all that, we do feel that the salaried and professional man would be dealt an injustice if such a plan were put into effect. He is taxed to the limit right now. Again, we wonder if the cost rates as published would actually be sufficient to pay for all the added services plus many new hospitals which would have to be built. The main objection, however, that this writer has to such a scheme is that we are fast developing a number of schemes which should all come under one head rather than several heads. Instead of an Unemployment Insurance Act, a Health Insurance Act and later an Old Age Pension Plan, why not consolidate all three under one Social Security head. Surely Accountants have been taxed far beyond reason in deductions at the source now, without any further deductions. Moreover, is it not a fact that the average worker re-acts very unfavourably to deductions from his wages. By this we mean that he and she figure the net amount of pay received as their earnings. They do not take into consideration the fact that they will have bonus and War Savings Certificates and Compulsory Savings coming back to them at a later date or that they are insured against unemployment or sickness or old age. The thing they look at is the amount on the pay cheque. It seems to us that some other method of collecting will have to be found if the workers are to believe solidly in Social Security schemes. Either that or we shall have to conduct an intensive education of the workers to the end that the various deductions are actually savings. We know, of course, that any purely voluntary system will not work, but the fact remains that far too many of our workers live for to-day, to-morrow can take care of itself, and that is the thing we have to combat. We believe further that the C.C.F. party could, if it wished, and it probably doesn't, do much to counteract the feeling that the government is interested only in taking away the pay of the workers and

could educate the workers to believe that Social Security Compulsory schemes are for the good of the workers generally. Until the workers are educated opposition to the cost of such schemes and even to the schemes themselves will be manifold and will react against the government responsible for them. Why not a composite Social Security Plan covering all phases under one head at a consequently lower cost than would be possible under separate heads? Let us have the details of the services to be rendered and the cost of such services. This, together with an intensive effort to educate everyone to the real necessity of such a composite scheme would brush away a lot of opposition but again do not let us soak the salaried and professional man to the point where he thinks he would be better off digging ditches.

Across the Secretary's Desk

Since the last issue of Cost and Management the writer has had the privilege of attending the meetings of the Niagara and Kitchener Chapters and cannot refrain from saying something concerning the remarkable increase in enthusiasm displayed this season by the members of these two Chapters. Both are extremely well organized. Their meetings are extraordinary well attended. The membership is increasing in each Chapter at a good rate and, in general, it is an inspiration to visit these Chapters and to see the interest displayed. There are other Chapters, of course, where similar conditions exist but in in no Chapter throughout the Dominion has such transformation occurred as in the aforementioned Chapters.

The London Chapter is deserving of high praise and Ted Costain, Cliff England and Frank Ware are doing a grand job.

In the larger centres the attendances have fallen off somewhat but in the smaller centres attendances have very materially increased.

While on this subject it is very gratifying to report the vastly increased interest in the Edmonton and Vancouver Chapters. Edmonton is away out in front in the race for the Fernie Trophy. Kitchener is 2nd but the Vancouver Chapter may yet cause surprise.

As many of our members already know the writer and Harold Wright were authorized at the last Annual Meeting to give all possible aid to the newly organized Alberta Provincial Society in obtaining passage of a Private Bill similar to those already passed in Ontario and Quebec. Harold Wright is in the West at the time of writing and we understand that he has quite a story to tell concerning flying conditions on the trip to Western Canada in winter. "Yours truly" and Aleck Howey also have a story to tell concerning driving conditions between Hamilton and Guelph trying to keep an automobile from doing a dipsy doodle on something akin to a skating rink around midnight is not my idea of a good time.

R. D.

Chapter Notes

Kitchener.

Despite the worst kind of weather, resulting in icy roads, the March meeting of the Kitchener Chapter was a "honey".

Forty-six, most of whom had driven from Galt, Preston, Kitchener and Fergus, were present at the Royal Hotel, Guelph, to hear A. G. Howey, R.I.A., speak on "Standard Costs". Mr. Howey excelled himself and the discussion period lasted until quite late. The next meeting of the Chapter will be held in Kitchener and the closing meeting in Fergus.

Hamilton.

About fifty members sat down to dinner at the March meeting of the Hamilton Chapter and many others attended the meeting to hear Mr. T. F. Parker, B.A., of United-Carr Fastener Ltd., Hamilton, speak on "Job Evaluation and Merit Rating in Industry" at the Royal Connaught Hotel. Mr. Parker gave an excellent talk and the discussion period which followed was quite lively. Mr. H. M. "Hal" Hetherington, R.I.A., Dominion President, will address the members at the April Meeting and it should be a dandy for our Dominion President is very popular here.

Niagara.

Mr. G. M. "Mel" Walker, R.I.A., of Sheldon's Ltd., Galt, was the guest speaker on the occasion of the March meeting of the Chapter, held at Thorold. The subject was "Job Evaluation" and Mr. Walker illustrated a very fine talk with lantern and the General Secretary of the Society acted as "Keeper of the Lantern". There was good attendance and the meeting was thoroughly enjoyed.

Ottawa Chapter.

Mr. Nelson Allan, R.I.A., of Reliance Industries Ltd., Belleville, is to be the guest speaker of the Chapter on the occasion of the March meeting on the 29th at the Chateau Laurier Hotel. His subject will be "A Cost Accountant's Views on Accounting for Fully Depreciated Assets". Mr. H. M. Hetherington, R.I.A., is expected to address the members at the April meeting.

Windsor.

The March meeting of the Windsor Chapter is to be a joint meeting with the Detroit Chapter, N.A.C.A., at Detroit Leland Hotel. The speaker will be Professor Eric Roll, head of the Dept. of Economics, University College, Hull, England. His subject will be "International Finance".

Edmonton.

Harold P. Wright, R.I.A., President of the Society of Industrial and Cost Accountants of **Ontario,** was greeted by a large attendance of members on his recent visit to **Edmonton.** His subject, "Excess Profits" was very well delivered and much **enjoyed.** Mr. Wright, in humorous vein, also recounted his experiences on **his much** delayed flight from Ontario. At the close, he was accorded a hearty **vote of** thanks.

Calgary.

Mr. H. P. Wright, President of the Society of Industrial and Cost Accountants of Ontario, was the guest speaker of the Chapter at the March

meeting. Mr. Wright was in the West in connection with the application of the Alberta Chapter for a Private Bill in the Alberta Legislature. Mr. Wright addressed a large attendance on "Excess Profits" and was loudly applauded at the close of a very fine meeting.

Vancouver.

The March meeting of the Chapter was a most excellent one with a fine attendance to hear H. P. Wright, President of the Society of Industrial and Cost Accountants of Ontario, speak on "Excess Profits". Mr. Wright proved an excellent speaker with a real knowledge of his subject and received a hearty vote of thanks for his efforts. He also gave details of the Private Bill in Alberta which has just passed the Legislature and urged the Vancouver Chapter to increase its membership to the point where it could apply for similar legislation in B.C.

ARE YOU GOING WEST?

Members travelling West and who would like to address Chapters from Fort William-Port Arthur west are urged to communicate with the Secretary-Manager.

New Members

Montreal Chapter.

J. Howe, 637 Craig St. W., Montreal

W. H. McMillan, Noorduyn Aviation Ltd., Montreal

Bay of Quinte Chapter.

C. H. MacDonald, Income Tar Division, Dept. of National Revenue, Belleville

Toronto Chapter.

J. Logan, Dunlop Tire & Rubber Co. Ltd., Toronto

C. H. Sanders, C. H. Sanders & Co., Toronto

G. J. Mickler, Ontario Hydro Electric Power Commission, Toronto

Kitchener Chapter.

F. P. David, Dominion Electrohome Industries Ltd., Kitchener

B. J. Thouless, Savage Shoe Co. Ltd., Preston

F. Shaker, Seagrams Ltd., Waterloo, Ontario

Windsor Chapter.

W. H. Gatfield, Western Ontario Broadcasting Co. Ltd., Windsor

B. M. Best, McCord Radiator & Mfg. Co. Ltd., Windsor

Niagara Chapter.

A. Boyce, Garden City Paper Mills Ltd., St. Catharines, Ontario

Vancouver Chapter.

V. J. Christison, Boeing Aircraft of Canada Ltd., Vancouver ....

V. E. Fiemann, c/o B.C. Bridge & Dredging Co. Ltd., Vancouver

Calgary Chapter.

A. P. Bowsher, Pacific Petroleum Ltd., Calgary

E. Connelly, C.A., 210 Toole Peet Building, Calgary

J. H. Cooper, Palm Dairies Ltd., Calgary

A. J. Davis, Palm Dairies Ltd., Calgary

C. S. Evins, Palm Dairies Ltd., Calgary
R. S. Gibb, Palm Dairies Ltd., Calgary
M. D. Rosenberg, M.D. No. 13, Calgary

London Chapter.

W. J. Wilkey, Kellogg's Ltd., London

Hamilton Chapter.

Colin Sharp, Steel Co. of Canada Ltd.
J. Bracewell, Hamilton Bridge Co. Ltd.

Edmonton Chapter.

A. F. Rocque, Edmonton Paint and Glass Co. Ltd., Edmonton
J. S. Henderson, Great West Saddlery Ltd., Edmonton
W. H. McKinnon, The Standard Iron Works Ltd., Edmonton
W. A. Thevierge, Dominion Income Tax Dept., Edmonton
E. J. Short, The Edmonton Bulletin Ltd., Edmonton
J. P. Bush, Luscar Coal Co. Ltd., Luscar, Alta.
J. D. Duncan, Patriquin, Johnson & Co., Edmonton
A. G. Aldridge, A. G. Aldridge and Co., Edmonton
M. Kellas, Dept. of National Revenue, Edmonton
R. D. Thomson, Dominion Income Tax Dept., Edmonton
F. G. Winspear, Winspear, Hamilton and Co., Edmonton

Literature Received

Valuation of Inventories.

C.C.A. March, 1944.

A most interesting article on a subject of real interest to all Industrial Accountants.

Inventory Methods.

N.Y.C.P. A. February, 1944.

A series of questions and answers dealing with this subject.

Statistics Can Help Costing.

Cost Accountant. March 1, 1944.

A short but interesting article of value to Cost Accountants.

Personal Notes

I. Beckerman of the Toronto Chapter is now a Lieutenant in the R.C.O.C.

Maurice White, well known member of the Niagara Chapter, is now a member of the "Wavy Navy".

So is Herb Green, the very eficient and personable Secretary of the Toronto Student Section. Herb is a Writer and both he and his "Costic Comments" will be sadly missed around Toronto.

J. H. Charnock of the Fort William-Port Arthur Chapter recently was commissioned as a Navigator in the R.C.A.F.

Good Luck to all these boys!

Alberta Provincial Chapter

THE ALBERTA PROVINCIAL SOCIETY HAS NOW BEEN INCORPORATED BY PRIVATE BILL IN THE ALBERTA LEGISLATURE WITH POWERS TO GRANT THE DEGREE OF R. I. A. TO MEMBERS PASSING ITS EXAMINATIONS AND FULFILLING CERTAIN OTHER REQUIREMENTS. THE BILL PASSED THE PRIVATE BILLS COMMITTEE ON MARCH 6th AND WAS GIVEN ASSENT ON MARCH 23rd.

THE OFFICERS OF THE SOCIETY ARE AS FOLLOWS:

PRESIDENT—J. A. TUPPER, SUNLAND BISCUIT CO. LTD., EDMONTON.

1st VICE-PRESIDENT—WALTER NOBBS, SUCCESSION DUTIES BRANCH, DEPARTMENT OF NATIONAL REVENUE, CALGARY.

2nd VICE-PRESIDENT—F. D. SUTCLIFFE, GREAT WEST GARMENT CO. LTD., EDMONTON.

SECRETARY-TREASURER—J. B. WHELIHAN, 10124 - 104th STREET, EDMONTON.

THIS IS THE THIRD PROVINCIAL SOCIETY TO BE INCORPORATED, THE OTHERS, OF COURSE, BEING ONTARIO AND QUEBEC, AND IT WILL BE GOOD NEWS TO ALL MEMBERS TO KNOW THAT ORGANIZATION HAS COMMENCED IN BRITISH COLUMBIA TO SECURE INCORPORATION IN THAT PROVINCE.

Cost Determination in Aircraft Production

By Newman L. Smith, Manager, Inventory Accounting Division, Lockheed Aircraft Corp., Burbank, Calif.

This is a broad subject, entirely too broad to even scratch the surface in a limited presentation of this kind. I think the best that we can do is to consider some of the major cost problems confronting the aircraft industry and what the possible solutions to these problems might be.

As you all know, cost determination or cost accounting is at best a very inexact science. Even in old, established industries you will find different approaches to cost finding, representing the differences of opinion of those engaged in cost work and the differences in the desires of the various managements. This latter is a rather important factor.

Position of Aircraft Industry with Respect to Costs

Within the last year or so, I have had the opportunity of making two trips around the country and have visited many of the large aircraft plants. It would appear to me, from observations made on these trips, that the matter of cost determination has fallen far behind the wonderful strides made in aircraft production. I would like to venture the opinion that as of today very few manufacturers of aircraft know what their true costs are, and, consequently, are unable to exercise any fine degree of control over costs. Many aircraft cost men will probably rise up in wrath at this statement; nevertheless, I honestly believe it to be true. I can recall one of the top men in the Army Air Forces Auditing Staff saying eighteen months ago that one of the largest aircraft companies had developed a fine cost system and knew exactly what every part of an airplane cost. Frankly, I was envious of that company and of their cost personnel, because we were having a very rough time in attempting to accomplish this for what was then the Vega Aircraft Corporation. It so happens, however, that a few months later this company with the reported fine cost system, had to ship to another company thousands of parts in order to get that company started on a production program for the same airplane. Months rolled by without the receiving company being billed for these parts, even though the billings were to be made on a cost-plus-a-fixed-fee basis. Inquiries were always put off with the statement that the bills would be forthcoming shortly. Finally, it was admitted that they were having difficulty in determining the cost of the parts shipped, and, at the present time, it looks as though the Army Air Force will cancel the original deal and furnish the material GFE. Now I am not saying these things in the spirit of criticism, because there are many forces at play creating problems which to me are unsolvable within a short period of time. These problems, in my opinion, have made the determination of costs in the aircraft industry a truly difficult task. Let's take a look at some of them.

Growth of the Industry

Problem one, I feel, results from the spectacular growth of the aircraft industry within a relatively few years. To see just what this implies, we will make a comparison. Most of us, I believe, have come to look upon the gigantic automobile industry as composed of fine, well-integrated, smooth-running organizations, who know what the product costs and have controlled

costs within very fine tolerances. Competition has been the lifeblood of these industries, and only those companies which have been able to produce a quality product at a lower cost than competition have survived. Now these examples of really smooth-functioning organizations did not get that way over night, nor did they get that way within the period of four or five years in which the aircraft industry has evolved from a "peanut stand" business where the owner was the designer, purchasing agent, works manager, treasurer, sales manger, etc., to one of the leading industries in the country. On one of my trips back East, I was in the main administration building of one of the big three in the automobile industry. I was greatly impressed with the utter absence of confusion and hustle and bustle throughout that entire large building housing thousands of employees, this despite the fact that the company had converted its entire facilities from the manufacture of peacetime products to wartime products such as guns, tanks, aircraft engines, etc.

I commented on this fact to the Director of Industrial Accounting of that organization. His reply, which I felt was very much to the point, was, "The people in the aircraft industry are undoubtedly going through the same stage of confusion, 'not know how', and turmoil that we were going through when I came to this organization in 1917, at which time we were building World War I war products for the United States Government. It took us many years after the war to build up and develop the type of organization you have just commented on."

In other words, the growth of the automotive industry followed the natural laws of supply and demand during the period from 1910 to 1925, and during these fifteen years the many problems of material control, cost control, production control, and of tooling and engineering, which deveolped with the gradual expansion of the industry, were solved as the need arose. If we take the comparable period in the aircraft industry from 1927 to 1943, we find that the growth for the first twelve years—that is up to 1939—was very small, and it was not until the outbreak of the European War that the need for additional aircraft manufacturing facilities in this country was realized. I believe that never before in the history of industrial development has an expansion program taken place to compare with the forced expansion of the aircraft industry during the last four years. Almost insurmountable problems of engineering, tooling, production, organization, and personnel were bound to result.

It should be apparent, I believe, to all of us in the accounting and cost accounting profession that to develop accurate cost determination under the problems created by record breaking, forced expansion is nigh impossible. Mass production in the aircraft industry came into being over night with the war. With mass production came the demand for an ever-expanding output of airplanes, regardless of cost. The primary concern of all aircraft managements was how to get the airplanes out of the factory. How it was done did not matter as long as they performed according to specifications.

Design Changes

I believe the second problem having a direct bearing on cost determination is the design changes which have been forced upon aircraft manufacturers by the war. As our ships got into actual combat duty, and as the tempo of the war increased, it was necessary to make many and frequent changes

in design in order to keep our fighting and bombing planes equal or superior to those of our enemies. Also, as the type of air warfare being waged changed, our aircraft had to be changed to meet these new conditions. When England was being almost bombed out of existence in 1940, the need was for fast fighting ships. After that, the complexion of air warfare changed to that of short-range bombing raids on the part of the United Nations. Then came the need for four-engine bombers with greater bomb loads, greater cruising ranges, and higher flying ceiling. In recent months, we have seen the necessity for long-range fighting ships to convoy the long-range bombers, because of the fighter opposition being encountered. Today we are witnessing the development of aircraft with much heavier firepower in the form of 75MM cannons, and, perhaps, rocket guns, as well as the development of jet propulsion airplanes and stratosphere bombers with ranges, ceilings, and bomb capacities that will make our present bombers look ineffective by comparison.

Now, all of this has made for a continuous stream of engineering changes, which mean material changes, production changes, tooling changes, etc., and many of these changes were made retroactive down the assembly lines and even to parts and subassemblies which had already been manufactured. During a recent two-month period, one bomber model alone had 1,746 such changes, or an average of approximately 33 per production day. I think you will agree with me that cost determination under such conditions is a ticklies proposition.

Production Techniques

I mentioned before that mass production came into being in the aircraft industry over night. Prior to the advent of mass production, aircraft was practically a hand-fashioned, custom-built product. Obviously, the production methods necessary to build two thousand airplanes a year are not the methods which can turn out two thousand or more a week. Nor was it possible to transfer to the aircraft industry in their entirety the mass production methods of other industries. Consequently, during these few short years of terrific expansion, production processes and production methods have been undergoing one change after another, and they are still going on today.

Plant layouts which were considered adequate at the start were later found to be wanting, with the consequent result of continual alteration in factory work areas, the shifting and relocating of assembly lines, fabrication shop processes and tooling jigs and fixtures. This is problem number three having a direct bearing on cost determination.

Untrained Personnel

To my way of thinking, problem four resulting from this expansion was the necessity of hiring thousands upon thousands of untrained workers, both supervisory and non-supervisory. In certain parts of the country, particularly on the Pacific Coast, the only reservoir of manpower was the farms and small towns, with the exception of those people who were drawn from the industrial Middlewest and East. Most of these people had never seen a factory before and were not factory-conscious. All of you know that it takes a certain amount of paperwork to properly run a large industrial enterprise, but to these people untrained in factory ways, paperwork was something which somebody said should be done and nobody cared particularly how it was done, or whether it was done at all. The cry was, "Get the

airplanes out, to hell with the paperwork." Parts and material charged to one job were robbed and used on another job. Time consumed on a job was charged to some other job, because the necessary shop orders were not available, and so forth. I can recall a visit from a neighbor of mine one night some months ago, during which he took great delight in telling me how he, a dispatcher in an aircraft factory, obtained materials and costly parts without a properly signed requisition.

Another case comes to mind. During a recent internal audit, a storekeeper was rather concerned about the presence of auditors checking his stock. He finally screwed up enough courage to ask the auditor just how much of an error he was permitted in his store's records. Was the five or ten per cent plus or minus which he had heard so much about in the aircraft business satisfactory, insofar as records were concerned? These stories which, believe it or not, are true could be multiplied manifold, but I believe that you get the point that cost determination without the necessary paperwork is quite a problem.

Trend Toward Stabilization Within the Industry

The foregoing are all general problems and were presened in order to give a brief idea of what the controller, the chief accountant, or the cost accountant of an aircraft company is confronted with in attempting to develop and install an accurate cost finding system. In addition, all accountants have been confronted, during the war period, with the lessening in importance of the financial executive in management councils. I believe this is always true in times of good business.

Now, the solutions to the general problems relating to the aircraft industry which I have outlined appear to be in the making. The expansion period is about over. In the month of December, the aircraft companies of this country produced approximately 9,000 aircraft; very few new plants are being built, nor are existing plants being materially expanded. Design changes are still being made, but with less frequency, and there is now an attempt on the part of the various military services to freeze designs on current models and to incorporate any new designs in new models which will roll off the assembly lines in later months. With the end of expansion in sight and with the stoppage or the slowing down of the design changes will come a greater degree of stability in production techniques. Personnel is gradually becoming trained in factory ways and methods, and the rapidity of personnel turnover is diminishing. Moreover, the procurement agencies of the armed services have completed their programs well into 1946, and where contracts are being negotiated for production two years hence, production planning of a more constructive and permanent nature can be done by the manufacturer. Also, the military services are now concentrating production on certain essential airplane models. All of these things are tending toward a small degree of standardization and stabilization within the industry.

Cost Determination vs. Cost Control

Before discussing some of the specific problems of aircraft cost determination, it might be advisable to determine just what it meant by cost determination. From various things I have read and listened to, it seems to me there is some confusion existing in peoples' minds as to just what is cost determination, and what is cost control. People often refer to cost control when they actually mean a cost finding or cost accounting system. In my opinion, there

is a distinct difference between the two, just as there is a distinct difference between a material record system and inventory control, and a scheduling or a shop loading system and production control. You may have the finest, most accurate cost accounting system or material record system without any cost control or material control whatsoever. Control of any function comes into the picture only when some one with intelligence and vision plans and regulates that function.

Moreover, it seems to me that there is considerable difference in what people mean by cost control, and it might be in order for us to look into this for a moment or so. To my way of thinking, there are two ways in which to control costs:

(1) The over-all managerial control of costs as recorded dollarwise on the books of account, and,

(2) The detail control of costs from an operating or shop standpoint based on production data and not in any way converted into dollars. Such data is stated in terms of physical units, like pounds, feet, men, etc.

In some concerns the recording of costs, both dollarwise and operational wise for control purposes, is accomplished through the cost accounting system, while in other concerns the two functions are split between accounting and the factory. I am one that believes the system for controlling detail operational costs should be established where the labor, material, and equipment are being consumed and utilized. To me "cost determination" is the accurate recording of the cost of the product or products being manufactured so that the product may be correctly priced from a sales point, and work-in-process inventories, finished goods inventories, and cost of goods sold may be correctly valued, thus reflecting a true balance sheet and profit and loss position, and to bring to management's attention the variances between actual costs and predetermined or budgeted costs, so that costs can be controlled.

Aircraft Manufacturing and Standards

I think we all agree that the simplest and most economical cost determination system, and the system which provides current rather than historical costs, is one based on sound standards; however, it is my feeling that there are certain prerequisites to the successful establishment of standards as a basis of costs.

These are:

(1) An accurate bill of material

(2) A fair degree of standardization of manufacturing processes

(3) Accurate routing and operation sheets

(4) The ability to set sound standards and maintain them currently.

And last, and probably one of the most important, is that the exception must be the exception and not the rule, as standard costing is founded on the principle of exceptions. To my knowledge, practically none of these prerequisites, to the extent necessary, are in existence in the aircraft industry today. And these conditions do not exist because the industry is not striving toward these ends but because of the reasons outlined previously under the four general problems confronting aircraft manufacturers, which, as stated, were more or less beyond the control of the individual companies.

Take for instance the bill of material. Because of the rapid changes in designs and manufacturing processes, it has been extremely difficult to

translate an engineering bill of material into a usuage bill of material, and, as far as we are concerned from a cost standpoint it is a usuable bill of material which must be used in costing a product on a standard basis. There are some ten thousand items of raw materials, purchased and standard parts, not including small items such as rivets, etc., which comprise the bill of material of Lockheed's twin-engine bomber, and some twelve thousand such items on the four-engine bomber. The changes which actually affect the bill of material have been running between two hundred and to five hundred per week on each model.

As to a fair degree of standardization in manufacturing processes and the establishment of accurate routing and operation sheets, I believe they are improbable of achievement under the fast-moving and ever-changing manufacturing conditions in the aircraft industry, and this can also be said about the ability to set sound standards and to maintain them currently. However, if it were possible to establish sound standards, it is undoubtedly true that the exception would be the rule rather than the exception, and an enormous and quite impossible task would be created in attempting to analyze and account for the exceptions or variances. In other words, we would have nothing but variances.

Lately, I have been hearing, and undoubtedly you have too, a great deal about bench standards, crude standards, synthetic standards, ersatz standards, etc. I am not exactly sure just what such standards are, but if I understand correctly what has been told to me by the proponents of such standards, these standards are not set by the well-established time study methods but are someone's judgment of the time required to do a job. I can see the possibility of using synthetic standards, when sound standards cannot be established, as a bogey or goal to shoot for and on which the efficiency or inefficiency of a department's operations or its percentage of accomplishment might be gauged to a certain extent, but I am wary of using this type of standard for product costing. I can also see that in an old, established industry with standardized processes and with industrial engineers or time study men of long experience reasonably accurate standards could be established by the method outlined above and without the aid of a stop watch on each and every operation performed on a given job. But I seriously question that the aircraft industry has sufficient men of the caliber necessary to set these synthetic standards with any degree of accuracy whatsoever, especially in view of the lack of job standardization in the industry. However, I am still open to conviction on the use of synthetic standards for costing purposes in place of soundly established standards. There is one thing of which I am quite certain and that is that synthetic standards of this kind could never be used as the basis for any kind of a wage incentive or bonus plan.

While we are on the subject of standards, I would like to quote from a recent address given by Oscar N. Lindahl, Financial Vice President of the Carnegie-Illinois Steel Company, in which he said:

> In many lines of business, in fact, standard costs with an analysis of variances from standards are best for operating officials in establishing controls. These variances are analyzed as to price, yield, usage, etc. Such analyses should be of inestimable value to those responsible for manufacturing costs, but if no analysis or follow-up is made, or if the

standards used are not accurate, we might just as well quit using standard costs.

I have also been told, although I cannot vouch for its authenticity, that one of the old-line companies which had used bench standards with a high degree of success for many years was forced to discontinue these standards when they converted one of their large plants from regular peacetime production to a wartime product.

If Not Standards—What?

You can readily see from the foregoing comments that it is my candid conviction that standard costs are not possible of attainment in the aircraft industry for some time to come, and probably not until the industry rebounds from the unsettled conditions which will inevitably result on the termination of the war. If this is true, how are we going to cost our product, or are we going to cost our product at all? Certainly the accumulation of actual job costs by parts, subassemblies, and assemblies in the aircraft industry is a backbreaking and costly job, but it can be done. The only other method, and a method which is used by a number of companies in the industry, is to collect contract costs or lot costs within the contract; however, we know from past experience that such costs are not very accurate, because in the urgency of the production program, costs between lots and even between contracts can become very greatly distorted. This is the present picture as I see it—standard costs impossible of attainment, actual job costs burdensome and costly, lot or contract costs open to gross distortion.

And another thing, insofar as the need for accurate cost determination is concerned, which today is very noticeable by its absence, is the lack of the profit incentive under highly competitive conditions. The Government is the only customer of the aircraft industry and will continue to be as long as the war lasts. A majority of the contracts are on a cost-plus-a-fixed-fee basis, and what profits can be made on fixed-price contracts are subject to high rates of taxation and to renegotiation. Many people, I am sure, take the attitude that cost by contracts, or lots within contracts, is all that is necessary, and it does not make a great deal of difference if costs are distorted between one contract as against another, because there is only one customer footing the bill. But to me this is a short-sighted policy, providing the manufacturer intends to remain in business after the war. Certainly no one can kid himself into believing that just as soon as the war stops and commercial aircraft business begins that he can immediately install and operate a sound cost determination system and effectively control the costs of doing business. Moreover, the lack of a cost determination system and cost control of some kind or other, regardless of how inaccurate it may be, certainly breeds waste and inefficiency. I believe that this point was very clearly made by Mr. Howell in his article in the N. A. C. A. Bulletin for December 15, 1943.

I believe with Mr. Howell that now is the time, despite current obstacles, to set into motion wheels for establishing a sound cost determination system. Accordingly, for the remainder of this paper I am going to try to outline my ideas, and the ideas of some of the people I have been associated with, of the nucelus of such a system. As you probably surmise from my ideas, and the ideas of some of the people I have been associated with, of the nucelus

of such a system. As you probably surmise from my previous remarks, the system will be based principally on standard costs.

Phases of an Aircraft Business

As I see it, there are four distinct phases of an aircraft business, excluding over-all administrative, selling, and financial functions. They are—

1. Engineering—The conception and design of an airplane and the construction of a mockup.
2. Tooling—The design and manufacture of project tools for airplane production.
3. Production—The manufacture of the airplane and replacement of spare parts.
4. Service and Repairs—The repair and servicing of the airplane after it has been sold.

Under normal conditions these phases follow each other in the sequence enumerated above; however, they overlap to some extent.

No uniform costing system can be devised to cover all four phases of the aircraft business as each phase, we believe, has its distinct problems, and different approaches are required. Accordingly, each phase will be dealt with separately, keeping in mind that costing by the principle of exceptions will be used wherever practical.

How to Cost Engineering

Direct labor—Standards on which to apply the principle of exceptions are neither practical nor possible in relation to creative work. Therefore, for costing purposes, direct engineering labor should be accumulated on an actual basis for each engineering project. For engineering control purposes, the hours spent should be recorded by engineering breakdown on a multiple job card made out daily by the employee.

Direct material—Should be charged through material requisitions to each job on an actual usage basis.

Overhead—All engineering overhead should be accumulated by experimental and project engineering burden centers and applied on a direct labor hour basis.

How to Cost Tooling

Direct labor—Direct labor is of two classes, design and manufacture. Because tooling is not repetitive, costing should be done on an actual job-order cost basis with job cards being made out by the workman for every job he does during the day. Both hours and dollars should be recorded. Control should be exercised through cumulative actual cost of tooling for airplane components for comparison with the tooling budget for each project. Daily control would be aided through time expended reports covering tooling departments and sections thereof.

Direct material—Should be charged through material requisitions to every tooling job on the basis of actual usage.

Overhead—Tooling overhead should be accumulated by tool design and tool manufacturing burden centers and applied on the basis of direct labor hours.

How to Cost Production

Production may be broken down into the four following phases:

1. Fabrication
2. Subassembly

3. Assembly
4. Flight

Here the principle of exceptions applies and all costing should be done on a standard basis with the variation from standard by contract being accounted for as a charge or credit to inventories, cost of goods sold, or profit and loss. The treatment of variance will be discussed a little later.

Direct labor—Fabrication—I believe the costing unit in fabrication is the part manufactured, in order accurately to evaluate work in process and cost of goods sold. Consequently, standard labor costs should be set for all parts manufactured. All fabrication departments should be sectionalized or stationized and actual time picked up by stations or by part, depending upon information needed.

Subassembly and assembly—These two phases cover the same general function, i.e., the taking of several parts and applying labor to form a larger part. These departments should be stationized and standards set for each operation in the station, resulting in a station over-all standard time. Actual time will be picked up by station.

Material—All material will be released to production on a standard bill of material basis and charged to process at standard costs. The inventory will be relieved at inventory prices and the variance will be charked or credited to a material price variance account by contract. All excess usage should be culled out on a material requistion basis and charged to a material usage variance account by contract at standard price.

Overhead—All manufacturing overhead should be accumulated for fabrication, subassembly and assembly burden centers and should be applied on the basis of direct labor hours.

Flight—All flight costs should be charged to the flight burden center by contract. Costing should be done on a standard cost per flight hour basis with variances charged to a flight variance account by contract.

How to Cost Service and Repairs

Direct labor—Costs should be accumulated on a job-order basis with workman making out a job card entry for each job done.

Direct material—Should be charged through material requisitions to each job on the basis of actual material usage.

Overhead—All overhead will be accumulated to the service and repairs burden center and will be applied on a direct labor hour basis.

How to Dispose of Variances

The treatment of variances has always been the subject of much heated discussion. There appears to be two schools of thought among accountants, and they represent practically opposite viewpoints. One group contends that standard costs are "true costs" and that variance from standard, if a debit balance, is not a cost of the product but a cost of waste or inefficiency and as such is a proper charge to profit or loss in the period incurred. The other group takes the stand that the only "true cost" is the actual cost and variances therefore should be restored to the cost of the product.

We could probably argue this point indefinitely. Therefore, I would like to contend arbitrarily that under normal productive conditions all variances arising from waste, inefficiency, or idle plant capacity should be closed to profit or loss, as incurred, not recognizing such costs as applicable to the cost of the product. All price variances should be subject to special

accounting treatment indicated by an analysis of the conditions in respect thereto, and such variances may be either restored to inventories and cost of goods sold, or written off directly to profit or loss.

You will note that I said "under normal productive conditions" because we do not yet know what normal conditions are in aircraft production. You in the aircraft business have all heard of the "learning curve." Up until recently it was contended that the productive hours per ship followed an approximate 70° curve from the first to the 250th ship, at which point the productive hours leveled off and remained fairly constant. In other words, it took approximately 250 ships worth of production before all of the bugs were ironed out of the fabrication processes and assembly lines and production could be considered on an efficient basis.

Now, if this were true and actually represented a chronic, irremovable condition inherent in the manufacture of aircraft, the theory of the treatment of variances, as expounded above, would not hold water, as costs would be greatly distorted during the early stages of production. Accordingly, under these conditions I would favor a careful calculation of these so-called "starting load" costs or pre-normal production costs and the accumulation of such costs in inventory values to be written off to cost of sales prorata on each ship as it is delivered. Once the normal production stage is reached, the variances resulting from waste and inefficiency should go to profit and loss as incurred.

However, from our own experience and the experience of almost every other aircraft manufacturer, as evidenced by figures recently released, the old standby learning curve is about to become as extinct as the "dodo" bird. Figures show that productive hours per ship continue to decline after the 250th ship, after 1000th ship, and even after the 300th ship, and so far there has been no indication of a leveling off process. Of course, this declining cost is due to improved manufacturing process, better organization, and the improvement in the efficiency of workers. I remember being told that the manhours on a bombing plane then in production were approaching the leveling-off point and that no further reduction of any size could be expected. This was over a year ago, and yet today practically the same plane is being produced in less than half the manhours forecast as the irreducible minimum and the trend is still downward. Just one more reason why the utilization of standard costs at the present time in the aircraft industry is impractical. Therefore I feel that any definite statement as to the disposition of variances is meaningless, and the ultimate treatment will rest upon the answer to actual operating conditions in the industry a few years hence.

Operational Control Information Derived From System

1. Engineering:
   (a) Actual engineering direct labor hours by project by engineering breakdown for comparison with budgeted hours.
   (b) Actual total engineering costs by project for comparison with budgeted total costs.
2. Tooling:
   (a) Actual tool design direct labor hours and costs by tool designs sections, by tool and by project for comparison with budgeted hours and costs.

(b) Actual tool manufacture direct labor hours and costs by tool and by project for comparison with budgeted hours and costs.

(c) Actual total tool design and manufacture costs by project compared with budgeted total costs.

3. Production:
   (a) Daily or weekly percentage of accomplishment by department and work area.
   (b) Daily or weekly breakdown of off-standard costs.
   (c) Total project production hours and costs for comparison with budgeted hours and costs.
4. Service and Repairs:
   (a) Actual total costs by job for comparison with sales value of job.

Prospects for the Aircraft Industry

I suppose that any paper of this kind would be incomplete without an expression of opinion as to the future of the aircraft industry. I, for one, believe that we are in the aircraft phase of the mechanical age in history. Possibilities appear almost limitless with safe and sound heliocopters for individual use, with giant passenger and cargo transports on the drawing boards and in production, with propellerless airplanes already flown and tested and with many other secret developments which will undoubtedly come out of this war. I think it is just as probable that you and I, with two or three weeks' vacation, will be able to get on a transport in Los Angeles and spend our vacation in China, India, or Australia, and probably at no more cost than if we used the present methods of transportation. Certainly, businessmen will not take trains to go from the West Coast to the East Coast, consuming three or four days in travel, when they will be able to make the same trip by air in ten hours or less. Naturally, I think that the first year or two after the war are going to be very serious years in the aircraft industry, and it probably will be necessary for some measures to be taken to tide the aircraft companies over this period. Once the glut of warplanes is removed, however, I can picture nothing short of an ever-expanding aircraft industry for many years to come.

We may not be flying in the same type of airplane that we know today, but we will travel **by air.** Maybe this Buck Rogers stuff is not as fantastic as it seems.

EXAMINATION DATES

Monday, May 1, Fundamentals of Cost Accounting	6 to 10 p.m.
Tuesday, May 2, Bookkeeping	6 to 10 p.m.
Wednesday, May 3, Advanced Cost Accounting	6 to 10 p.m.
Thursday, May 4, Accounting	6 to 10 p.m.
Friday, May 5, Industrial Organization and Management	6 to 10 p.m.

Applications to write these examinations must be made on the prescribed form, obtainable at 66 King Street East, Hamilton, Ont., and all applications must be accompanied by the prescribed examination fee of $5.00 per subject.

Applications should be mailed immediately to the office of the Secretary of the Provincial Chapter concerned, where such exists, or, to the Dominion Secretary, 601-602 MacKay Building, 66 King Street East, Hamilton, Ont.

Examinations will be held in any locality a sufficient number of candidates apply.

Responsibilties of the Personnel Manager

By George Walsh, Personnel Director Canadian Car & Foundry Ltd., Montreal
An Address Before Cost & Management Institute, Montreal

Due to the advent of the War, which has created a tremendous manpower problem and the numerous pieces of Dominion and Provincial legislation enacted to cope with the situation, coupled with the mushroom growth of many industries, it was realized that the creating of a Personnel Department to handle the many complicated conditions which had arisen, was necessary.

Personnel work, however, is not new. Most industries today owe their present reputation to personnel administration of some form or another. All large industries had their beginning in a small way. The owner was invariably his own accountant, engineer, salesman and often worked on the bench along with his workers. He knew his men intimately, called them by their first name and knew about their home life. These workers were definitely part of the business and took a tremendous interest in same. The fortunes of the boss was their fortune and a common feeling permeated the atmosphere. As the business increased, separate departments were created over a period of time, to take care of the accounting, purchasing, engineering, selling and factory supervision. All of these men were trained in their respective fields, and woe betide anybody who encroached upon their specific domain.

A great many books have been written and much has been said regarding the proper place of the industrial relations, or personnel, officer in the superstructure of an organization and it has been proven that it is a major division of any business. I will admit that a number of industries do not attach that much importance to the function of the industrial relations branch. The trend, however, in any far-sighted organization is definitely in that direction and present conditions have certainly accelerated the development. The industrial relations officer in an organization should report to the Top Executive of the Company.

Mr. Fred Crawford, President of the National Association of Manufacturers, said quite recently, quote: "I propose that every industry create a post of Vice-President of human relations. Let us make it positive, through Vice-Presidents of human relations, that statesmanship in industry will create constructive leadership. If proper importance is to be attached to the industrial relations or Director of Personnel's job, the man who holds it should receive top rating." Unquote.

Let us then review the qualifications necessary for this position.

1. He must possess a keen sense of fairplay so that both employees and employers get a fair deal.
2. He must be organization minded and know how to delegate assignments and must have management ability.
3. He must be practical and recognize the economic necessities of management, as well as to understand employees' problems.
4. He must understand human nature and the fundamental working of the human mind.

5. He must have the ability to express himself both orally and in writing, in a way that both management and labour will understand.
6. He must have salesman ability and be able to sell management's ideas to employees and interpret labour's ideas to the employer.
7. He must be a good negotiator and be able to conduct meetings between Management and Labour without letting the argument come to a boil.
8. He must be a good technician, able to analyze details concerning labour laws and have a retentive memory.
9. Finally, he must have that quality of anonymity. This means that he will not look for opportunities to claim credit, that he will enjoy engineering a deal for which someone else gets the praise.

So much for the Director of Personnel, or Industrial Relations Officer, as he is sometimes called.

Now a few words regarding department organizations. This depends upon the size of the organization. For instance, the Company I represent has nine major plants and three minor plants. Of the major plants, six are located in Montreal, one in Nova Scotia, two in Ontario. Here we have a condition that is somewhat different to many industries and the job of the Director of Personnel is somewhat complex. However, generally speaking, the departments should fall into seven natural divisions. Regardless of the size of the organization, there are seven functions which must be delegated to someone. In small organizations, consisting of 200 to 300 employees, one man can invariably take care of them all, but in larger industries, one division can become a fulltime job for one person in the Personnel Department. These divisions can be listed as follows:—

1. Employment, transfers, adjustments
2. Education and training
3. Wage administration
4. Safety—Health
5. Employee services
6. Personnel research
7. Labour relations

A great many industries have assigned jobs of this nature to various individuals in an organization, whose duties are not even allied to the definite functions of same. Such people are invariably tied up in their main job, that they cannot perform the work efficiently, and it is a well-known fact that many departments in an organization are jealous of their own particular functions, with the result that if personnel work is split up you cannot get co-ordination of services. The grouping of the personnel services under one department, co-operating with all departments is therefore the logical procedure.

Before I outline the seven major functions of the Personnel Dept., let us see why it is necessary that a Perosnnel Department should exist. Let us analyze the structure of any organization. It consists of a governing, or executive body, under which are arranged Accounting, Purchasing, Engineering, Operating, Sales and Publicity Departments.

The engineers design the machines and formulate the specifications; the Purchasing buys the machines and material in accordance with the drawings and specifications; the Accounting check the accounts and pay the bills; the Operating sees to it that production is maintained and the Sales Department

markets the products, while the Publicity Department sees to it that proper publicity is given.

Normally, one would think that this is a perfect setup. Yet we are forgetting the most important item, manpower. No matter how good the machine is, or how rigid the material specifications have been lived up to, or how religiously you pay your bills, the product cannot be manufactured without manpower assistance. Yet, too often we have considered labour as a cog in the machinery, which will move because other cogs move, and was, therefore, considered in the commodity class. When there is an abundance of labour available, wages are low; when labour is scarce, wages are high. This gave use to the idea that labour, affected by the law of supply and demand, was like a commodity. The commodity theory, therefore, caused disinterest in the workers personally and Management was likewise disinterested in their problems. He neglected the most important fact, that he bought and sold not the actual labour of the employees, but the products this labour produced, which should have been his chief concern. It is, therefore, not difficult to wonder that the employee's mind was diverted to protection rather than production and organized in any movement that he imagined would help to break down the commodity or machine consept of labour. Many employers conceived the idea of welfare movements, which were inaugurated. First Aid, lunchrooms, rest rooms, visiting nurses and a hoard of other movements. To the great surprise of many employers, these welfare efforts became points of attack by labour organizations, because it was felt that they were methods instituted to spy on the workers. It was then discovered that employees were not looking for paternalistic ideas, but recognition as human beings and individuals, and that the old conception of relationship between employer and employee was inadequate. Workers are human beings and should be treated as such and should have a voice in determining the rules and regulations under which they must work. The outgrowth of this realization has been the institution of industrial democracy with its shop councils, industrial councils, employee representation plans, suggestion and production committees.

It can, therefore, be readily seen that employees are becoming to be recognized as a definite integral part in an organization, therefore, a Personnel Department, the sole duty of which is to keep manpower functioning properly, plays a tremendous part in a properly organized industry.

Just as the other recognized departments in industry have become more scientific in their operation, due to research, so also have the various operations under the Personnel Department advanced.

1st—Employment, Transfers and Adjustments: In the past, this was a routine matter. The prospective employee filled out the application setting down his qualifications, and furnished references. The man was hired, given a clock number and then became the headache of the Department Foreman. After three weeks, it was discovered that the man did not fit in. He was discharged and another man tried out, or the employee was a friend of the Foreman and his shortcomings were immediately hidden, with a result that considerable money was being wasted. A scientific selection and placement and intelligent treatment of applicants is essential. In a great many industries, foremen still employ the men they require and, not very long ago, one of these foremen was asked what method did he use in selecting men. The

astonishing reply was, "One day I select men with blue eyes, another day I select dark haired people and another day, I select blonds. It depends on how I feel." This method of selection may satisfy the Foreman, but it is a costly procedure. We invariably do not do our own individual buying in this manner. We study the article closely and ask many questions about it before we make a decision. The same procedure should be followed in employment. Fit the right man in the right job. Job specification should be drawn up enumerating the exactness of the conditions which include education, previous knowledge, mental and physical condition of the employee. If employees are to be accepted as co-partners, then it is necessary to select the best you can get for the money you intend to pay.

The employee, once hired, should be given an outline of company policy and the rules and regulations in the plant. He should be introduced in a friendly manner to his department head and co-workers. This show of personal interest creates a good impression in the mind of the worker and makes him feel it is a good Company to work for. He still retains his individualism and does not merely become a number and a so-called cog.

There are two main sources of supply for employees, inside the Company and outside the Company. As a matter of personal policy, it is well to look first within the Company for employees capable of filling the requisition. This may mean employees now working, or those who have been temporarily laid off because of a shortage of work, but who are still carried on the active list of employees. Such a procedure offers opportunity for promotion to worthy employees, reduces labour turnover, improves morale and minimizes the cost. Tests properly designed to measure the mental alertness, special aptitude, achievement, physical dexterity, should be instituted in the selection of employees. These tests, however, should by no means be the sole criteria in making selections. They should merely supplement the other devices, rather than replace them. A great many of these tests have been standardizd to such an extent that they can be given by persons other than specialists and become a routine matter.

In many organizations, in which personnel practice is not advanced, the introduction of the worker to his position is a haphazard affair. In such instances the newly selected applicant is given a slip of paper and told to report to a certain party. This certain party looks at the slip of paper and tells the applicant what particular job he is supposed to do, and this invariably ends the induction. No effort is too great, to introduce properly the applicant, who is earnest and desirous of permanent employment, to his work.

Promotion is also part of the employment procedure, because you are taking one man from one job and placing him in another. It is the stepping up of an employee to a position in which he can lend greater service to the Company and promotions from within the Company are not so apt to be mistakes as are selections from without. The knowledge that deserved promotions are being made increases the interest of other employees in the Company and the desire to serve the interests of the Company. Where promotions are made from outside of the Company, it often causes a feeling of dissatisfaction among the employees and, for a period of time, production will lag. Therefore, it is necessary that a proper record be kept of all

employees, so that selections for promotion can be readily reviewed and prospective applicants given an opportunity to show their worth.

2nd—Training and Education: This is a tremendously important field. In war industries, many experienced employees have been trained to do certain jobs in a comparatively short time by breaking down the operation into sections and explaining each section in non-technical terms. I know of one Works Manager who experienced great difficulty in holding workers on the job because the worker could not read a micrometer. It appeared too scientific. After studying the matter, he evolved a system whereby he could break it down into dollar and cent symbols easily understood, with the result that any worker could, at the end of one half hour's instruction, become fairly proficient.

Training, however, does not take in just new employees; it should be extended to Chargehands, Supervisors and Foremen. Invariably, a Foreman is selected because he has had long service and is in line for promotion, or because he is a friend of the boss, or because he is a top-grade worker. While this method may have merit, it is not always wise. We must remember that the Foreman is the direct boss of the worker. He is the man the employee sees most and who gives him the work, therefore, it is essential that the Foreman be properly trained to handle this important job, and many courses are presently available at small cost per man. I would like to dwell much longer on this subject, because I feel it is tremendously important. It is through the Foreman that the employee has his closest contact with Management.

I have previously mentioned that promotions, if possible, should be done from within the Company. Therefore, the training of employees becomes a very important Company function and one that is apt to pay dividends in the future. How often have we seen it wherein a man at the head of a department suddenly decided to leave the Company for a position in another organization, or he should die. The difficult task of appointing his successor invariably takes place and Management sometimes select the wrong type of men and yet do not care to disturb the situation with the result that discord prevails. The training of assistants to department heads is a necessary procedure and gives Management the opportunity to know well in advance if his coverup man is capable of proceeding with the job. If not, he can immediately procede to substitute some other employee and, therefore, be prepared when any emergency may arise.

3rd—Wage Administration: Wage Administration as a defined function is coming to the fore. Because of Union pressure, wage-freeze regulations and compulsory Collective Bargaining. This has become a very important function and usually within the scope of the Personnel Department. Loose and unscientific wage administration can be one of the most prolific sources of dissatisfaction within an organization.

Job analysis, Time Study, Merit Rating and proper correlation of wages of office and shop workers should be given careful thought and study.

4th—Employee Services: This may be known as welfare work, such as athletic and social programs, housing, transportation and tax problems. Help in formulating credit unions, installation of councillors whose job is to listen to employee's external troubles and assist him to overcome them, if possible. During the present emergency, many industries have instituted

shopping services and day nurseries. No doubt, after the war, some of these services will disappear, but a great many will be retained.

5th—Safety - Health: These have to do with the physical well being of the employee and in a number of large industries are taken care of by the Medical Department, properly and efficiently operated. However, in cases of this nature, the health or medical department and the personnel department should be closely allied. Accident prevention program should be kept alive. It is an educational job.

6th—Personnel Research: All avenues of understanding of human nature have not been explored, and as we progress in the manufacture of a given article, so also must the personnel department keep up to date with the times, so that a great increase in worker interest is maintained, which tends to eliminate waste and increase production.

There was a time when scientific research was unknown in business. Not so many years ago, a chemist was thought of in the Steel Industry, as a well-meaning but quite useless individual. What did a chemist know about making steel? But the chemist to-day is one of the most important men in this industry. In almost all other fields of activity the rule-of-thumb method of administration is passing. It is also passing rapidly in the field of labour relations. Leaders in industry are not content to feel their way from day to day. They demand to know what factors in their labour situations are making for effectiveness of the operation and what factors are preventing it. Therefore, the recognition of the need for knowing facts has led people and industry generally to undertake practical research work on a scale that would have been pronounced "absurd" a few years ago. So, it is natural that we should find intelligent research work becoming more and more a factor in personnel administration. It is impossible to determine labour policies with benefit and with fairness to carry them into effect without having at hand, so far as possible, the facts bearing upon them. For instance, it is impossible to establish and practice policies designed to stabilize the work force without having the facts of labour turnover both the amount and causes investigated.

7th—Labour Relations: This is indeed a very important item and one which is invariably handled by the Director of Personnel, himself. It consists of negotiating labour contracts with labour unions, or other bargaining agents Act as interpreter of the various clauses in the Agreement. See that Plant Management and Employees understand the terms of the contract. Take a leading part in Management-Union discussions, including the processing of grievances. Be familiar with Federal and Provincial legislation governing labour and be vitally concerned with plant conditions, which may be sources of irritation.

Examination Papers, 1943

ADVANCED COST ACCOUNTING

1. The X Corporation, a company engaged in the production of war materials, is considering instituting the regular compilation of an operating budget for a six months' period.
   (a) Outline briefly the information which must be assembled to prepare the budget for the first six month period.
   (b) What advantages would be gained by operating under a budget system.

2. Smith Bros. make the following estimate of cost per machine on an order of 5 specially designed machines:

Material Cost	$ 3,250.00
Labour Cost	1,750.00
Manufacturing Expense	1,000.00
	$ 6,000.00

   For the month of April, the entire plant was occupied in the production of these machines. Transactions for the month were as follows:

1. Material purchased		$71,500.00
2. Material requisitioned		
Direct	$15,000.00	
Indirect	500.00	
		15,500.00
3. Direct Labour		6,500.00
4. Indirect Labour		1,000.00
5. Manufacturing Expense—Other		2,000.00

   Work was commenced on all 5 machines during the month and 3 were finished and delivered. Work-in-Process at 30 April was:

	Material	Labour	Mfg. Expense
Unit 4	complete	40%	40%
Unit 5	80%	20%	20%

   Accounting records are kept on an estimating cost basis, with 3 Work-in-Process accounts in use.

   Required:
   (a) Journal entries to record transactions for the month of April.
   (b) Revised schedule of estimated costs.
   (c) Statement of Cost of Manufacture.

3. (a) Discuss the arguments (1) in favour and (2) against including Interest on Investment as a Cost of Production.
   (b) What are the advantages of uniform methods in Cost Accounting.

4. Downing Company Limited is a subsidiary of White Corporation and is engaged exclusively in the processing of 4 by-products turned over to it by White Corporation.

   There are 4 different processes in the manufacture of Downing Co. main product, mixing, grinding, treating and finishing. At the conclusion of the treating department's work a new by-product "X" emerges in a completed condition. The cost of the by-product is estimated to

amount to 20% of the total cost to that point. By-product "X" comprises 1"5 of the output from the treating department.

The formula for materials used in Downing Co. processing requires:

By-product A 20% costing $10.00 per ton.
By-product B 30% costing $12.00 per ton.
By-product C 25% costing $20.00 per ton.
By-product D 25% costing $24.00 per ton.

A summary of operations for the month of March is as follows:

By-products turned over by White Corporation:

A-100 tons, B-150 tons, C-150 tons, and D-300 tons.

Materials put in process, 500 tons.

Expenses consist of direct labour expense, computed on tonnage of product handled in each department, departmental expenses, and general factory expenses and overhead calculated as percentage of direct labour cost. These were:

Department	Direct Labour per ton	Departmental Expense	General Factory Expense & O'head
Mixing	$20.00	60%	80%
Grinding	15.00	100%	100%
Treating	5.00	200%	20%
Finishing	5.00	300%	100%

During the process of grinding there is a 10% loss in weight.

At 31st March there remains in process 70 tons in the Grinding Department and 48 tons in the Finishing Department. Materials are all applied in the mixing department, and it is to be assumed that work in process for unfinished products is 50% of complete as regards charges other than materials.

All main products were sold to outside customers at $200.00 per ton.

The by-product has been sold to White Corporation, and the sale price of By-product "X" is to be adjusted so that Downing Company's net profit on all operations amounts to $8,000.00.

Prepare:

(1) Statement of cost per ton in each department and the cost per unit at each stage of production.
(2) Profit per ton of main product.
(3) Selling price per ton of by-product.

5. The Douglas Manufacturing Company produces a single product T.V. Its standard cost is as follows:

Material, 1 piece at $9.00	$ 9.00
Labour, 6 hours at 75c	4.50
Manufacturing Expense, 6 hours at $1.00	6.00
	$19.50

Standard Mfg. Expense ..... 5850 / Standard Labour hours ..... 5850 = $1.00 per hour

Production for the month of June:

950 units completed, plus
100 units ½ finished as to Labour and Mfg. Expense, all materials have been added.

Transactions for the month of June:

1. Purchase of materials—1250 pieces at 9.20.
2. Materials requisitioned—1100 pieces.
3. Payroll—5900 hours at 80c per hour.
4. Mfg. Expense—$6,200.00.
5. Sales—500 units at $26.00.

Required:

(1) Journal entries to record the transactions for the month, charging and crediting work in process accounts at Standard costs, and transferring variances to their proper accounts.

(2) A cost of goods manufactured statement.

(3) A condensed trading and Profit and Loss statement, assuming that selling and administration expenses amount to $3,000.00.

INDUSTRIAL MANAGEMENT

1. (a) Discuss briefly the merits and demerits of (i) Piece work rates and (ii) Day rates.

   (b) A component part of a product can normally be turned off a turret lathe at the rate of 5 per hour; the hourly wage rate for that type of work is 95c.

   If a piece work plan were being adopted, what should the rate be?

   What basis might be used to provide an incentive?

   What factors should be taken into account before any change from the hourly rate is put into effect?

2. A concern is being organized to extract a comparatively valuable product from a common and bulky raw materials. Power is an important factor in the process. The location of the plant is to be decided upon. Three sites are available—one in the neighbourhood of the raw material (called "R"), one near a plentiful power supply (called "P") and another at the market for the finished product (called "M"). Further data is as follows:

   (a) It is intended to treat about 500,000 tons of raw material per annum, with an output of 10 tons of finished product for each 100 tons of raw material processed.

   (b) Power consumption will be 30,000 h.p. per annum.
   At site "R" the rate is $30 per h.p. per annum.
   At site "M" it is $25 and at "P" it is $18 per h.p.

   (c) Freight rates are:—
   Raw material from "R" to "M"—$1.50 per ton.
   Raw material from "R" to "P"—50c per ton.
   Finished product from "R" to "M"—$3.50 per ton.
   Finished product from "P" to "M"—$4.50 per ton.

   (d) Labour cost at "R" is estimated at $ per ton of raw material processed; at "P" it will be about the same; while at "M" it will probably be 15% higher.

   (e) It is estimated that storage facilities at either "P" or "M" will entail capital expenditures of $100,000; while at either "R" or "P" housing facilities will have to be provided at an estimated annual expense of $15,000.

   (f) Real estate taxes are estimated:—

At "R"—$10,000 per annum; at "P"—$15,000 per annum; at "M"—$20,000 per annum.

You are required:

(a) To express an opinion as to which site should be chosen in the light of the above data.

(b) To mention any other matters which might require serious consideration before a final decision is reached.

3. If, as President, you desired to inaugurate a system of group insurance (including life, sickness and accident), in a large plant, what arguments would you use to (a) the directors, and (b) the workers?

4. What advertising media might be suitable for (a) a patent medicine; (b) machine tools; ((c) a laundry and dry cleaning establishment; (d) a custom tailor?

5 (a) "Overhead" is generally regarded as one of the most troublesome factors in business—at least from the financial, as distinct from the technical, point of view.

Why is it so troublesome?

(b) A concern knows almost exactly the cost of the materials necessary to manufacture a piece of equipment for which it has been asked to submit a price; it can also estimate the amount of labour involved, but is undecided as to what to add for Manufacturing Expense or Burden.

You are asked to outline briefly your views on the matter and to indicate how some kind of formulae might be laid down to serve as a guide in future.

6. Assuming the term "manager" to apply to any one of the large body of persons whose duty it is to administer and direct business as a whole without necessarily having a large personal financial stake:

What motives in your opinion are desirable in such a person?

7. A concern which uses cotton of a special grade as its raw material, has placed firm orders as follows:—

35,000 lbs. for delivery in January
40,000 lbs. for delivery in February.
25,000 lbs. for delivery in March.

It has the following "Futures" contracts outstanding:—

Short January—125 bales.
February—210 bales.
March—75 bales.

What should be the next step if it desires to protect its position? A bale may be taken as 200 lbs.

Aptitude Tests for Accountants

(Reprinted from "The Certified Public Accountant")

An aptitude test for public accountants was recently conducted in New York City by a graduate student at Columbia University, with the co-operation of the American Institute of Accountants.

The purpose of this type of test, technically known as the "Rorschach Group Method", is to diagnose personality and, consequently, aptitude for various vocations.

It has been applied extensively by recognized authorities both in this country and in Europe, and is similar to tests used by British and American armed forces in selecting personnel.

Briefly stated, the test consists of projecting a series of ten slides on a screen before a group of observers who are asked to record their impressions or responses individually on a special form of questionnaire. These replies are then analyzed and interpreted.

The test was applied in June to a group of public accountants, six of whom were certificate holders. The average age of members of this group was 32 years, 6 months; the average length of time devoted to public accounting practice was 7 years, 2 months. All the accountants taking the test had attended college for at least two years; eighteen held bachelor's degrees; one had received a master's degree.

With respect to their reasons for selecting public accounting as a vocation, thirteen of the twenty-seven accountants indicated that the choice was based on some degree of aptitude or interest, eight said it was determined by "purely economic" considerations; five had "just drifted" into accounting; and one did not answer this question. The chief ambitions of members of the group, rated according to the number of times mentioned, were: (1) economic security; (2) happiness in personal life; (3) recognition in the profession.

Inconclusive Results

Results of the test are inconclusive because of the limited size of the group to which it was applied.

The following summary is based on an analysis of the questionnaires in accordance with standard Rorschach interpretations: Fifteen of the twenty-seven accountants tested belong to that category of individuals who like to sit back and consider a question quite thoroughly before venturing to do anything about it. They are cautious in their approach to new situations and take their ideas rather seriously. Their impulses are held in abeyance until the problem has been studied from all angles. Eighteen of the twenty-five can be described as "well balanced, mature and adjusted." They conform to the conventions of the particular culture in which they find themselves; get along easily with their fellow men; and are flexible in their thinking—not set in their ways.

Of the twenty-seven accountants, eighteen can be classified as introverts rather than extroverts. With respect to intellectual aspects of personality, eleven of the twenty-seven can be regarded as "very superior"; eight as "superior". Of the very superior group, nine were introverts.

Further Tests

In spite of the limited significance of this particular experiment, it is believed that further study of aptitude tests may prove useful to the profession and to those who are considering the practice of public accounting as a career.

The President of the American Institute of Accountants has recently appointed a committee to study the matter of aptitude tests for students of accounting.

PERCY WRIGHT BEREAVED

ALL MEMBERS, WE ARE SURE, WILL LEARN WITH EXTREME REGRET AND WILL JOIN IN OFFERING CONDOLENCES TO OUR IMMEDIATE PAST PRESIDENT, P. W. WRIGHT, MONTREAL, WHO HAS JUST RECEIVED WORD THAT HIS ONLY SON, SUB. LT. GORDON WILLIAM WRIGHT, R.C.N.V.R., HAS BEEN REPORTED MISSING AND PRESUMED DEAD. SUB. LT. WRIGHT JOINED THE R.C.N.V.R. ON GRADUATING FROM McGILL UNIVERSITY IN 1943 AND WAS IMMEDIATELY LOANED TO THE ROYAL NAVY.

THERE IS LITTLE THAT ONE CAN SAY TO ALLEVIATE THE GRIEF OF HIS SORROWING PARENTS BUT, "GREATER LOVE HATH NO MAN THAN THIS THAT HE LAY DOWN HIS LIFE FOR HIS FRIENDS."

"COST AND MANAGEMENT" ALSO EXTENDS ITS SINCERE CONDOLENCES TO JAMES HEUGHAN IN THE RECENT LOSS OF HIS WIFE. MR. HEUGHAN IS A VALUED MEMBER OF THE MONTREAL CHAPTER.

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